

Position Description

Classification Guide: Equipment Development Grade Evaluation Guide
 Part I, Product Development Engineering

Factor I - Assignment Characteristics:

The incumbent serves as computer engineer, technical advisor, and acknowledged expert on web systems for the Information and Visioning Branch (IVB). Web systems encompass the design, development, and deployment of hardware and software to support applications that are enabled by the web. These systems provide unique capabilities in intranet, extranet, and Internet environments. The specific job functions include:

- Conceives, advocates, plans, conducts, and manages work in areas involving the implementation of pioneering web technologies where little or no previous experience factors for guidance exist and exercises technical responsibility for continuation of the work.
- Develops new methods and techniques that provide significant technical and operational impact for Agency-level projects and demonstrates the effectiveness of new concepts and ideas for achieving particular mission goals and objectives.
- Manages advanced research and development projects to ensure the timely and successful completion of projects where the incumbent analyzes and evaluates complex projects, contractors' proposals, and proposed policies for merit and alternate approaches; provides expert direction based upon technical, scientific, cost, and other considerations.
- Formulates new project objectives and defines requirements to meet these objectives at the Center and Agency level.
- Leads the technical work on Agency projects and projects involving multiple government agencies, industry, and academia; reviews and assesses progress, resolves technical issues and seeks methods for overcoming actual and potential problems.
- Leads the technical work on Agency-level teams and committees where unique mastery of advanced theory, principles, techniques, and practices of web systems engineering is required.
- Reviews technical literature, publications, reports, and policies; evaluates trends and identifies promising approaches for achieving significant advancements in operational and mission capabilities; proposes and leads the incorporation of approved new technology via Center, Agency, and intra-Agency teams.
- Maintains a working knowledge of related fields such as digital/analog video, multimedia, systems administration, networking, and system security, in order to evaluate projects from a broad perspective.

Factor II - Level of Responsibility:

The incumbent independently plans, manages, and carries out project activities. The supervisor sets the overall objectives and resources available. Decisions, recommendations and findings of the incumbent are considered technically authoritative and are accepted as final by Agency level managers. For example, his participation in the NASA Knowledge Management Team and the STI program influenced Agency level decisions for work in that area. The incumbent plans and accomplishes work assignments within the framework of mission objectives, time, staff and funding limitations. Completed work is only reviewed for adherence to policy, fulfillment of program objectives and impact on overall Agency programs.

Guidelines include Agency regulations and policy, guide specifications, technical manuals, and established standards. These guidelines are rarely adequate for solving the complex and unusual engineering problems with which the employee is faced, thus the incumbent exercises judgment and ingenuity in extending existing methods or developing new ones. He applies a high degree of originality and technical judgment to complete assigned projects. Techniques and processes developed by the incumbent are considered technically authoritative and are used to guide others in the field.

Because the incumbent works in areas where little precedent or guidance exists, assignments routinely involve solving major problems in a broad range of activities and highly specialized web systems. The incumbent's responsibilities include exploring and evaluating new technology and establishing the feasibility of new concepts. The incumbent makes decisions in solving highly complex technical and programmatic issues. The work involves many areas of uncertainty requiring new developments to extend beyond the current state of the art. The incumbent analyzes unique problems, and develops new and improved techniques and methods. In addition, the incumbent provides advice and guidance to Agency managers on matters of such difficulty that leading experts are not in complete agreement as to the proper approach or probable outcome of significant and far-reaching development efforts.

The incumbent leads and directs pioneering development efforts involving matters of exceptional importance having far-reaching consequences to the Agency. The incumbent evaluates the effect of significant technological changes on Agency policies, mission objectives, requirements and goals. The work of the incumbent influences both the Agency programs and the work of technical specialists within and outside the Agency.

Employee Accomplishment Record

1. Name: Jon Alwase Does

2. Education

Bachelor of Science in Mathematics, The College of Virginia, 1981

Masters of Science in Computer Science, The College of Virginia, 1989

3. Relevant Professional Training Received

WebObjects (2000)

Introduction to Java Programming (1997)

Advanced Java Programming (1997)

Object Oriented Programming in C++ (1994)

Source Evaluation Board (1993)

Digital Image Processing (1990)

Simulation (1990)

Formal Methods of Software Engineering (1990)

Analysis of Algorithms (1990)

Theory of Programming Languages (1990)

Theory of Computation (1990)

Theory of Operating Systems (1990)

4. Professional Experience

a. Present Assignment

Dates (From: 1994 To: Present)

Brief Description of Position and Titles of Projects: Mr. Does serves as a computer engineer in the Information and Visioning Branch (IVB), Analysis Competency (AC). He conceives, advocates, plans, manages, and conducts work in the rapidly evolving field of web technologies. He also leads pioneering development efforts to achieve previously unattainable goals for NASA missions.

1) Scientific and Technical Information (STI) Program :

(55% of total time divided into 60% development, 15% research, 15% management, and 10% grant/contract monitoring)

The STI Program is an Agency level program (LaRC manages the program as the Principal Center) with responsibility for gathering the broad wealth of scientific and technical information that is generated by the Agency and disseminating that information to the Agency, U.S. aerospace companies, educational institutions, the Nation, and ultimately the world.

Mr. Does manages high-profile IT web systems for the STI Program. In this capacity, he assesses market currents and applicability of STI's core assets. He identifies promising new technologies through regular literature reviews and Internet resources. He judges the potential of evolving standards and the risks associated with early adoption. And he experiments with new technologies to evaluate practicality and robustness. Mr. Does combines his assessments and evaluations to define pioneering technical directions. He presents, advocates, and supports these directions to the Agency's STI managers. He serves as project head to realize end products within budgetary and time constraints. His current projects include the next-generation version of the NASA Image eXchange (NIX), Machine Aided Indexing (MAI), and Report Document Page (RDP) integration.

Mr. Does leads the technical evaluation of inter- and intra- Agency project proposals, contracts, and grants. He provides final technical judgment on worthiness and viability. He monitors progress and adherence to requirements and schedules. He analyzes critical development problems and investigates potential security or regulation violations. He proposes alternate courses of action to resolve issues. He evaluates performance and final product. Current examples of his efforts include the Technical Report Interchange (TRI) project by Old Dominion University (ODU) in conjunction with Los Alamos National Laboratories, Air Force Research Laboratories, and Sandia National Laboratories; annual NIX grants allocated to multiple NASA Centers; and the Center for AeroSpace Information (CASI) Re-Engineering Proposal.

Mr. Does serves as technical lead and represents the STI Program on Agency-level committees. He also manages the STI Program's positive technology transfer (PTT) activities.

2) Aviation Safety Program (AvSP)

(45% of total time divided into 75% development, 25% research):

The goal of the AvSP is to develop and to demonstrate technologies that contribute to a quantitative reduction in the aviation fatal accident rate. LaRC leads AvSP in partnership with Glenn Research Center, the Federal Aviation Administration (FAA), the aviation industry, and the Department of Defense.

Mr. Does serves as technical lead on the Aviation Safety Analysis and Functionality Evaluation (ASAFE) project. He reviews technical literature for current and potential trends. He fuses trends with original contributions to propose new ideas for providing unique technical capabilities that were previously unattainable. He is responsible for determining viability of these ideas and for determining whether to proceed or to change course. Mr. Does incorporates his final ideas into the design and development of pioneering data mining and data analysis capabilities. He partners with other government and industry principles to utilize their unique local resources for mutual benefit. He creates automated and user-driven test engines to insure the integrity of the system. He analyzes both real and potential problems and supplies the most advantageous remedies.

Finally he provides efficient and flexible systems within time constraints for use within a secured extranet environment.

Name and Title of Supervisor, Team Leader(s) and/or Project Chief(s):
Gus Rolland (Branch Head)

b. Previous Professional Positions

Dates (From: 1986 To: 1994)

Brief Description of Position and Titles of Projects:

As an engineer for the Flight Software and Graphics Branch (FSGB), Mr. Does planned, directed, and developed advanced visualization systems and methods to support a broad range of Agency research programs and projects. These systems and methods include advanced computer graphics, analog/digital video, animation, data analysis, and the underlying mathematical and computational methods that provide the basis for this technology. His primary research efforts concentrated on distributed processing techniques including the development of the Agency's first distributed ray tracing system for calculating advanced properties of optics and physics, while executing on multiple computers working in parallel. He presented this research at a Senior Management Research Review (SMRR).

Mr. Does developed and managed the operation of a state-of-the-art digital video-editing suite, the Scientific Visualization System (SVS), which far exceeded the capabilities available at any other Center and all but a handful of commercial video operations. He directed the efforts of a range of personnel who were required to operate SVS including video producers, video editors, and video engineers. Videos produced for customers across the Center received numerous awards as well as being featured on national news and the Discovery Channel. Several stellar examples include the "HL-20 Personnel Launch System", "High Speed Research (HSR)", and "Control-Structures Interactive" videos.

Mr. Does conceived and constructed the Branch Imaging Lab (BIL). He enabled integration of the separate functions of image processing, graphics, and video. He acted as a Center-wide resource for visualization of experimental and theoretical data. BIL received a Federal Leadership Team Award from a consortium of federal government (Dept. of Defense, Dept. of Veterans Affairs, U.S. Senate, Patent and Trademark Office, and U.S. House of Representatives) and industry (Federal Sources and KnowledgeWare) representatives.

5. Significant Scientific/Engineering/Technical Accomplishments

a. **NASA Image eXchange (NIX) - 1996:**

The STI program chartered the STI Photographics Subgroup to "recommend a practical method for improving access to NASA's image resources within 6 months" with no initial

funding. Instead of a recommendation, the Subgroup produced a fully functional product that was released to the world within the same 6-month time frame.

Mr. Does served on the STI Photographics Subgroup as technical lead. The technical lead role had two challenging aspects: technical and political. The representatives from the Centers were accustomed to inter-Center "competition" so it was a formidable task to align all of the conflicting interests and maintain that alignment throughout the process. Mr. Does employed numerous techniques to hold together the fragile, voluntary coalition. Some of the techniques included:

- Recognition that unfunded mandates would not accomplish team objectives so requirements were geared to eliminate or minimize resource impacts at the Center level while still providing for a state-of-the-art system
- Acknowledgement that the Subgroup members were from diverse backgrounds so reliance on abstract technical concepts would be non-inclusive. Employed rapid prototyping to provide hand-on examples for evaluation by all.
- Open communication was absolutely critical. The key enabler to overcome the geographic dispersion was an ongoing web site to encapsulate all ideas, data, and decisions from the Subgroup. This was one of the earliest applications of web technologies for knowledge management within the Agency (HQ participants were especially enamored of this idea).
- Understanding of each Center's technical capabilities by a complete analysis of repositories and resources at each Center. This insured that each Center could fully participate by establishing requirements based on the lowest common denominator for resources available. This knowledge also allows Mr. Does to serve as a technical consultant for Centers that are exploring, defining, and implementing new repositories.
- Appropriate credits for each Center's assets and a fairness doctrine built into the search engine to insure that all Centers received equal representation. Also multiple direct links to each repository to support the continuance of each Center's unique repository.
- All software developed at LaRC was freely shared and included technical support, this allowed Centers without repositories and the necessary technical resources to be included. Several Centers including HQ went from no local capabilities to extremely sophisticated sites in just a couple of months because of this bootstrap effort. The result is the complete participation of all NASA Centers in NIX.

The technical issues involved in the software development process were equally formidable. Mr. Does had responsibility for identifying the complete requirements for software, hardware, network, security, reliability, and performance; and reaching consensus from the Subgroup on those requirements. Due to their uniqueness and complexity, no commercial solution could satisfy the requirements; this necessitated the development of a novel and unproven system. The final system was completely distributed employing child sub-processes running in parallel to access resources stored at each Center. Unique adaptations of

a special purpose protocol were introduced to accommodate the demands of serving multimedia (e.g. photos/images, movies/videos, and audio). Response timers ensured that slow or offline repositories did not degrade the performance. Subject browse categories stored at the appropriate Center of expertise, but constructed using centralized web-based tools, allowed alternate searching techniques. A mirror system was established at Glenn Research Center to balance processor loads and to serve as a mutual back-up system. The system is so responsive and efficient that the public and industry experts are convinced that it really is a centralized system like the commercial applications.

NIX rates as one of the most used web sites provided by NASA and consistently receive high commendations from surveys and unsolicited user comments. It has received numerous accolades from commercial sites, further supported by prominent listings on those sites. Mr. Does received and accepted an invitation by Disney to present the technical details behind NIX and to provide recommendations on their related corporate efforts. Generated 2 Positive Technology Transfers (PTT). The high profile of NIX as an Agency product played a major role in the awarding of a NASA Exceptional Achievement Medal to Mr. Does.

Contacts: George Goodfellow and Lynn Knowles

b. Aviation Safety Analysis and Functionality Evaluation (ASAFE) - 1998:

The goal of the ASAFE project was to design and develop a web-based safety benefit assessment tool to quantitatively evaluate accident reduction research and technology development by analyzing relevant historical accident data. This was a joint project with NASA Aviation Safety Program (AvSP), Federal Aviation Administration (FAA), NASA Glenn Research Center (GRC), U.S. Navy, industry partners, and academia.

Mr. Does was recruited to join the project based on his web system's expertise. His role was to define the requirements and then design and develop a system that satisfied the requirements, accommodated the varied user base, and met the strict deadline constraints. Requirements were determined through an iterative refinement process using operational strawmen for hands-on interaction; this approach allowed rapid consensus on concrete requirements and dramatically reduced software development time. The design was a multi-tiered solution involving 4 servers, 5 database instances, and the establishment of a strict protocol amongst the major players including the FAA. The development progressed rapidly due to the requirement process and optimal design while still providing a scalable solution that was flexible enough to handle the incorporation of a newly developed database well after ASAFE was released for production use. One novel feature in particular was a database-driven code generator to insure the creation of highly reliable code while accommodating the evolving taxonomy conversion specifications.

Besides increasing the understanding of accident pre-cursors, unintended uses for ASAFE were discovered. The FAA realized that ASAFE could perform complex data-mining operations in seconds that traditionally were performed manually over several weeks. The high performance of ASAFE lent itself to experimentation by iterative analysis thereby providing a more comprehensive understanding. ASAFE also led to several technology spin-offs including Fingerprint and DNA analyses. Finally ASAFE was instrumental in achieving

program level I milestones of AvSP for annual safety goal assessments and for evaluation of 40 safety impact products. Also ASAFE contributed to the success of the AvSP Non-Advocate Review (NAR), the Aviation Safety Program Executive Council review, the Aerospace Safety Advisory panel, and the Independent Annual Review (IAR).

ASAFE runs in a secured extranet environment with a tightly controlled user community including representatives from AvSP, NASA InterCenter Systems Analysis Team, Federal Data Corporation (FDC) Reliability Engineering Team, FAA, NASA GRC, University of Illinois, Boeing, National Center for Atmospheric Research (NCAR), AeroTech, and the Commercial Aviation Safety Team. Users have 24x7, worldwide access and, as a testament to the intuitive design, no training or manuals were necessary to immediately begin productively using the system.

Lastly, ASAFE was selected as LaRC's nominee for the "NASA Software of the Year" competition in which it was awarded honorable mention.

Contacts: Vicki Carroll and Carl Trainer

c. **Langley Image Scanning, Archiving, and Retrieval (LISAR) - 1995:**

Mr. Does initiated a project to solve the problem of providing universal access to LaRC's photographic repository. He formed a multi-disciplinary team consisting of personnel from several divisions as well as academia, and served as team leader. Through careful management of the requirements process, a viable set of requirements emerged that encouraged the team to proceed with development. Due to the scope and complexity of the requirements, Mr. Does also served as technical lead.

Mr. Does had responsibility for the design and development of the software, the specification and implementation of the hardware, and the definition of the protocols and processes. Several tasks were assigned to contractors that required monitoring, performance evaluation, and shifts in technical direction when obstacles occurred. He provided regular reports to upper level management on the progress of the project.

The end product, LISAR, was the first image repository at the Agency to support a number of unique features that were not available in commercial products at the time. These features included multiple resolutions of each image to support slow network connections as well as professional printing applications; web-based metadata and image submission with automatic indexing and multi-resolution generation; both keyword and browse category searching capabilities; an adaptation of a high-end 500 CD-ROM jukebox for preserving master images; and an automated hard-copy facility. LISAR was also integrated into the NASA Library's Galaxy system to provide multimedia access for library searches.

Coincidentally Mr. Does received a request to help in the documentation of the Long Duration Exposure Facility (LDEF) that allowed the direct observation and analysis of the effects of space environment on a large number of experiments during the 5.5-year spacecraft deployment. The documentation requirements were print, CD-ROM, and web for over 700

photographs and accompanying metadata. Recognizing the similarities, Mr. Does used LDEF as the first data set for LISAR. Mr. Does supervised the enormous digitization process, created the tools for performing image processing to support the needs of each individual media, mapped the metadata into LISAR's database, designed and developed the CD-ROM with associated documentation, and integrated LISAR's data with the online version of the "Photographic Survey of the LDEF Mission" (NASA Special Publication 531). By repurposing data and automating processes, the LDEF documentation process was completed on time and with efficient use of limited resources.

As the first web-based image repository with multiple search capabilities in the Agency, LISAR technology was transferred to other NASA Centers (Headquarters, Glenn Research Center, Goddard Space Flight Center, Kennedy Space Center, and Marshall Space Flight Center) to allow them to instantiate an online presence with minimal effort. The software was also requested by, released to, and deployed by the U.S. Navy and Hewlett Packard. Generated 7 Positive Technology Transfers (PTT). LISAR also lead to the development of a spin-off project for LaRC's dynamic media called the Langley Animation and Video Archive (LAVA).

Contacts: Mike Smith and Marilyn Jackson

6. Scientific/Engineering/Technical Leadership

- 2001-Present NASA Knowledge Management Team
 (Agency-level with representatives from each Center)
 Representing STI Program with expertise in Machine-Aided Indexing (MAI) and
 NASA subject category/thesaurus issues
 Developing information architecture for NASA portals

- 1998-2000 NASA Digital Television (DTV) Video Archiving/Cataloging Group
 (Agency-level with representatives from each Center)
 Technical lead with expertise in digital video production and multimedia web
 systems
 Co-authored recommendation report

- 1997-1999 NASA Webmasters Working Group
 (Agency-level with representatives from each Center)
 Served as Official LaRC Webmaster
 Expertise in technical aspects of web systems
 Responsible for developing and disseminating policy

- 1997-1998 LaRC Website Re-Design Team
 (Center-level with representatives from multiple organizations)
 Technical advisor with expertise in web systems
 Team completed first major overhaul of LaRC's top-level web site

- 1996-Present Scientific and Technical Information (STI) Photographics Subgroup

(Agency-level with representatives from each Center)
Technical lead with expertise in web systems and digital media
Chief architect and developer of NASA Image exchange (NIX)

- 1996-1998 LaRC World Wide Web (WWW) Expert Center Team
(Center-level with representatives from multiple organizations)
Technical lead with expertise in web systems
Created multiple products including the Freedom Of Information (FOIA) web site, Class Registration System, Online Survey, and Conference Room Reservation System.
- 1995-1996 Data Visualization and Animation Lab (BIL) Group
(Branch-level)
Group leader with expertise in visualization applications and digital video
Planning, budgetary, and marketing responsibilities
- 1994-1995 LaRC Photographic Database Team
(Center-level with representatives from multiple organizations)
Project team leader and technical lead
Developed web-based repository of LaRC photographs and images
Received two Team Excellence Awards

7. Professional Scientific/Engineering/Technical Service

- 2002-present Association for Computing Machinery (ACM)
2000-2001 American Institute of Aeronautics and Astronautics (AIAA)
1983-1994 Association for Computing Machinery (ACM)
Special Interest Group for Graphics (SIGGRAPH)
1983-1994 Institute of Electrical and Electronics Engineers (IEEE) Computer Society

8. Inventions, Patents Held: None

9. Honors, Awards, Recognition, Elected Memberships

- 2001 - Performance Award (awarded by Information and Visioning Branch)
For sustained excellence in the development of web-based tools in support of the Scientific and Technical Information Program goals
- 2000 - NASA Software of the Year - honorable mention and certificate of recognition
(awarded by NASA Inventions and Contributions Board)
For the creative development of a technological contribution which has been determined to be of significant value in the achievement of the space and aeronautical activities of NASA, and is entitled: Aviation Safety Analysis and Functionality Evaluation (ASAFE)
- 2000 - NASA Software of the Year nominee (awarded by LaRC Software Advisory Panel)
Aviation Safety Analysis and Functionality Evaluation (ASAFE)

- 2000 - Performance Award (awarded by Information and Visioning Branch)
For sustained excellence in the development of web-based tools for Center and Agency projects
- 1999 - Exceptional Achievement Medal (awarded by NASA Administrator)
For exceptional achievement in the design and development of advanced information technology systems for application to NASA programs
- 1999 - Performance Award (awarded by Information and Visioning Branch)
Sustained excellence in the development of web-based tools for Center and Agency projects
- 1998 - Letter of Commendation (awarded by Aeronautics Systems Analysis Division)
For support of planning process towards Non-Advocate Review (NAR) of AvSP
- 1998 - Superior Accomplishment Award (awarded by Information Systems and Services Division)
Exceptional achievement in the development of the ASAFE system
- 1997 - Letter of Commendation (awarded by Agency STI Program)
For dedicated work with the STI Photographics Subgroup for the development of the Agency's NASA Image eXchange (NIX) and for sustained efforts to support and improve NIX
- 1997 - Superior Accomplishment Award (awarded by Information Systems and Services Division)
Exceptional contributions to the development of the NASA Image eXchange system
- 1997 - Certificate of Outstanding Performance (awarded by Information Systems and Services Division)
In recognition of the outstanding manner in which you have performed your duties during the rating period from October 1, 1995 to September 30, 1996
- 1996 - Team Excellence Award (awarded by Internal Operations Group)
Langley Image Scanning, Archival, and Retrieval (LISAR) Team: For development of the Langley Image Scanning, Archival, and Retrieval (LISAR) system
- 1996 - Team Excellence Award (awarded by Internal Operations Group)
LaRC Photographic Database Team: For creative application of information technology to the development of the NASA Langley Research Center's photographic database
- 1996 - Certificate of Outstanding Performance (awarded by Information Systems and Services Division)
In recognition of the outstanding manner in which you have performed your duties during the rating period from October 1, 1994 to September 30, 1995

- 1995 - Quality Step Increase (awarded by Information Systems Division)
Coordinating video productions for analysis and presentation of engineering and scientific data.
- 1995 - Superior Accomplishment Award (awarded by Information Systems Division)
Exceptional leadership in the development of the Langley Image Scanning, Archival, and Retrieval (LISAR) system
- 1994 - Certificate of Outstanding Performance (awarded by Information Systems Division)
In recognition of the outstanding manner in which you have performed your duties during the rating period from February 3, 1993 to January 1, 1994
- 1994 - Quality Step Increase (awarded by Information Systems Division)
Technical support in creating computer-generated visualizations.
- 1992 - Federal Leadership Team Award (awarded by a consortium from the federal government and industry)
As a member of the Data Visualization and Animation Lab for outstanding group achievement in making government more effective through the use of Information Systems
- 1990 - Superior Accomplishment Award (awarded by Analysis and Computation Division)
Exceptional achievement in developing new and unique software for interfacing video and computer systems
- 1989 - Group Achievement Award (awarded by LaRC Center Director)
Integrated Multidisciplinary Analysis Team: Outstanding accomplishment in developing a unique, integrated analysis capability and for applying the Integrated Multidisciplinary Analysis Tool capability to a number of major NASA space programs
- 1988 - Certificate of Recognition (awarded by NASA Inventions and Contributions Board)
For creative development of a technical innovation which has been published as a NASA Tech Brief entitled: Solid Modeling Program (SMP)
- 1988 - Group Achievement Award (awarded by NASA Administrator)
Hypersonic Computational Fluid Dynamics Team: In recognition of their efforts in developing and demonstrating computational fluid dynamics analysis tools making possible the design of hypersonic air breathing vehicles, in particular, the National Aero-Space Plane
- 1985 - Group Achievement Award (awarded by NASA Administrator)
Space Station Systems Engineering and Integration Team: For the timely development, conversion, delivery, and installation of the LaRC IDEAS software programs at the Johnson Space Center in support of NASA responsibilities of systems engineering and integration of the Space Station

10. Work Product List

a. Publications

Does, William H.C.; Knowles, N. Lynn; Binkley, Robert L.; Curry, Marty A.; Slater, Richard T.; Nolan, Gerald J.; Griswold, T. Britt; Kovach, Robert D.; Corbin, Barney H.; Hewitt, Raymond W. 1998: *NASA Image eXchange (NIX)*. NASA/TM-1998-206925

Matthews, Christine G.; Posenau, Mary-Anne; Leonard, Desiree M.; Avis, Elizabeth L.; Debure, Kelly R.; Moving, Kathryn; Does, Bill 1992: *Image Processing Mini Manual*. NASA-TM-107680

Smart, Donald P.; Writer, Arthor H.; Does, William H.; Doors, Raymond L.; Matthews, Christine G. 1989: *Building Mathematical Models Of Solid Objects*. NASA Tech Briefs v.13 issue 3 p.68

Smart, D. P.; Writer, K. H.; Does, W. H.; Doors, R. L.; Matthews, C. G. 1986. *SMP: A solid modeling program version 2.0*. NASA-CR-178183

Bowker, D. E.; Davis, R. E.; Does, W. H. C.; Myrick, D. L. 1984: *Estimation of spectral reflectance signatures from spectral radiance profiles*. International Symposium on Remote Sensing of Environment Proceedings, Volume 2, Environmental Research Institute of Michigan, p. 795-814

Doors, R.L.; Matthews, C.G.; Does, W.H.; Smart, D.P.; Writer, K.H. 1984: *Computer Generated Animation and Movie Production at LaRC: A Case Study*. NASA Contractor Report 172375

Smart, Donald P.; Writer, Arthor H.; Does, William H.; Doors, Raymond L. 1984: *SMP - A Solid Modeling Program*. NASA Contractor Report 172473

Writer, K. H.; Smart, D. P.; Doors, R. L.; Does, W. H. 1984: *The Solid Model Geometry Generator (SMGG)*. NASA Langley Research Center Computer-Aided Geometry Modeling, NASA Publication 2272, p.10

b. External Agreements

PTT #592: Langley Image Scanning, Archiving, and Retrieval (LISAR) system transferred to Navy and used for their classified photograph collection.

PTT #606: Langley Image Scanning, Archiving, and Retrieval (LISAR) system transferred to NASA Headquarters and used as the basis for the Agency's image repository called GReatest Images of NASA (GRIN).

PTT #610: Langley Image Scanning, Archiving, and Retrieval (LISAR) system transferred to Marshall Space Flight Center (MSFC) and used as the basis for their Center's image repository called MSFC Image eXchange (MIX).

PTT #613: Langley Image Scanning, Archiving, and Retrieval (LISAR) system transferred to Goddard Space Flight Center (GSFC) and used as the basis for their Center's image repository called Public Photographic Image Retrieval System (PPIRS).

PTT #618: Langley Image Scanning, Archiving, and Retrieval (LISAR) system transferred to Glenn Research Center (GRC) and used as the basis for their Center's image repository called GRC ImageNet.

PTT #834: Langley Image Scanning, Archiving, and Retrieval (LISAR) system transferred to Kennedy Space Center (KSC) and sub-components used for their Center's image repository called Kennedy Space Center Image Archive.

PTT #835: Freedom Of Information Act (FOIA) web system transferred to Kennedy Space Center (KSC) and used as the basis for their FOIA web site.

PTT #836: Freedom Of Information Act (FOIA) web system transferred to Dryden Flight Research Center (DFRC) and used as the basis for their FOIA web site.

PTT #837: Freedom Of Information Act (FOIA) web system transferred to Johnson Space Center (JSC) and used as the basis for their FOIA web site.

PTT #838: Freedom Of Information Act (FOIA) web system transferred to Stennis Space Center (SSC) and used as the basis for their FOIA web site.

PTT #839: Freedom Of Information Act (FOIA) web system transferred to NASA Headquarters and used as the basis for their FOIA web site.

PTT #840: Plot3D to Virtual Reality Mark-up Language (VRML) translator transferred to Helsinki University of Technology and used for model conversions and web dissemination.

PTT #841: Plot3D to Virtual Reality Mark-up Language (VRML) translator transferred to Ames Research Center (ARC) and used for computational fluid dynamics model conversions and web dissemination.

PTT #849: NASA Image eXchange (NIX) browse page builder transferred to Ames Research Center (ARC) and used for local browse page development.

PTT #850: Langley Image Scanning, Archiving, and Retrieval (LISAR) data model transferred to Hewlett-Packard and used in the development of their internal image repository.

PTT #851: NASA Image eXchange (NIX) transferred to Dryden Flight Research Center (DFRC) and used to integrate their image repository with NIX.

c. Web Systems

1. **NASA Image eXchange (NIX)** - A meta-search engine for searching for multimedia assets at all NASA Centers. Spawns Center-specific child processes that execute in parallel under timer constraints and assembles results using local weighting and global ranking. Includes browse categories that are controlled at the Center-level with uniformity maintained by a web-based browse page builder. Developed using Perl and a structured field version of Wide Area Information Search (WAIS) protocol. The user base spans the globe. NIX currently accesses more than 700,000 NASA images.
2. **Aviation Safety Analysis and Functionality Evaluation (ASAFE)** - Analyze U.S. aircraft accidents from the National Transportation and Safety Board's (NTSB) database using a standardized taxonomy developed jointly by government, industry, and academia. Supports local state information for restart capabilities, Boolean operations to compare multiple analysis runs, charting functions, and local analysis using spreadsheet export function. Primarily developed using Perl and multiple database instances on MySQL and Oracle servers. Restricted user base limited to key players from government, industry, and academia due to security issues.
3. **Langley Image Scanning, Archiving, and Retrieval (LISAR)** - Searchable repository of LaRC's multimedia assets. Newly revised to utilize the latest technologies such as eXtensible Mark-up Language (XML) and virtual local searching, to include the dynamic assets from the Langley Animation and Video Archive (LAVA), and to serve as a test bed for the next-generation version of NIX. Developed using Perl with original XML parsers and translators. Since it is integrated into NIX, LISAR shares the same global user base.
4. **Machine-Aided Indexing (MAI)** -Unique tool to analyze technical documents for phrases that can be correlated to specific index terms from NASA's controlled vocabulary. Also provides search and browse capability of the NASA Thesaurus; and a shopping cart feature for temporary storage of user-selected terms. Uses optimized data structures to store several databases for fast access and created using Java servlet technology. Developing Memoranda of Understanding (MOU) with the Department of Energy (DoE) for incorporating DoE's thesaurus into MAI (having completed initial analysis of correlations). Primarily used by the Center for Aerospace Information (CASI) for indexing technical reports, also actively used by Johnson Space Center and Glenn Research Center.
5. **Freedom Of Information Act (FOIA)** - NASA's first FOIA web site for the dissemination of primarily contract related documents. Includes a complete process for generating the Optical Character Recognition (OCR) version of the paper documents and a web form for direct uploading. Features field searching and

automatic indexing. Developed using Perl and WAIS. Primary customers are U.S. companies interested in competing for LaRC contracts.

6. **Class Registration System** - Virtual class sign-up sheet with multiple time slots, email notification and dynamic waiting lists. Modified version for Wind Tunnel University includes supervisor concurrence. Eliminates need for human resources to add or delete class attendees using secure methods while maintaining paper-based simplicity. Developed using Perl. Created while working for the WWW Expert Center; maintenance turned over to Office of Chief Information Officer (OCIO). Access restricted to LaRC users and class organizers.
7. **Online Survey** - Statement-based survey form using proven statistical practices. Surveyor provided with web-based control of survey statements and real-time statistical analysis of survey results. Dramatically eases the process of survey creation and eliminates any effort in the evaluation of results. Developed using Perl. Created while working for the WWW Expert Center; maintenance turned over to Office of Chief Information Officer (OCIO). Used for numerous polls at the Center and the Agency.
8. **Conference Room Reservation System** - Uses building and room number navigation integrated with LaRC's Geographical Information System (GIS) maps and dynamic calendar generation to reserve conference rooms. Consolidates widely dispersed paper-based methods into an open and easily accessible system. Created while working for the World Wide Web (WWW) Expert Center; maintenance turned over to Office of Chief Information Officer (OCIO). Used to reserve a number of conference rooms throughout the Center and restricted to LaRC users.